



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/532,354

09/06/2005

Makoto Takemoto

38161

9056

52054

7590

07/14/2008

PEARNE & GORDON LLP  
1801 EAST 9TH STREET  
SUITE 1200  
CLEVELAND, OH 44114-3108

EXAMINER

PATEL, DHAVAL V

ART UNIT

PAPER NUMBER

2611

NOTIFICATION DATE

DELIVERY MODE

07/14/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patdocket@pearne.com  
dchervenak@pearne.com

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/532,354	TAKEMOTO ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	DHAVAL PATEL	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 22 April 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 April 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/22/2005</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Drawings***

1. **Fig. 4 thru Fig. 7** should be designated by a legend such as **--Prior Art--** because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

2. Claim 6 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim can not refer back to another multiple dependent claim. Claim 6 is multiple dependent claim which is dependent upon another multiple dependent claim 3. See MPEP § 608.01(n).

### ***Claim Rejections - 35 USC § 101***

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 6 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding claim 6, line 1; recites "A program" for realizing a computer as the respective units included in the communication apparatus according to any one of claims 1 to 5. However, "a program" is not limited to that which falls within a statutory category of invention (i.e. it is not a process, machine, manufacture or a composition of matter), therefore it is non-statutory subject matter.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in **Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966)**, that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows: (***See MPEP Ch. 2141***)

- a. Determining the scope and contents of the prior art;
- b. Ascertaining the differences between the prior art and the claims in issue;
- c. Resolving the level of ordinary skill in the pertinent art; and
- d. Evaluating evidence of secondary considerations for indicating obviousness or nonobviousness.

5. **Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant admitted prior art (hereafter AAPA) in view of Kim et al. (US 2003/0072397) (hereafter Kim).**

Regarding claim 1, AAPA discloses a communication apparatus (Fig. 4), comprising a diversity structure formed by a plurality of branches (Fig. 4, First branch

Art Unit: 2611

and second branch), wherein each of the branches includes: a signal amplifying unit (Fig. 4, amplifiers, 5a and 5b) that amplifies a reception signal ( Fig. 4, reception signal thru antennas 1a and 1b) and is changeable a gain of the reception signal ( Fig. 4 amplifiers, 5a and 5b); and a gain set value calculating unit ( Fig. 4, AGC processing unit, 100a and 100b) that measure a reception level of the reception signal amplified by the signal amplifying unit ( Fig. 4, 5a and 5b)and calculate a gain set value for adjusting the gain of the signal amplifying unit on the basis of the reception level ( page 3, lines 6-24 discloses that each gain processing circuit measures a reception level from baseband signals of an signal obtained from the amplifier and arithmetic operation unit 1003 obtains a gain set value which indicated by a signal to adjusting a gain of the variable gain amplifier);

But, AAPA does not explicitly discloses that branches share a gain set value selecting unit that compares the gain set values calculated by the gain set value calculating units of the respective branches to select a predetermined gain set value, and supplies the predetermined gain set value to the signal amplifying units of the respective branches.

In the same field of endeavor, Kim teaches digital front end for a wireless communication system in which branches (Fig. 6, amplifiers, 58a and 58b receives the signal from the respective antenna branches 18 and 18b as shown in Fig. 2), gain control circuit (Fig. 6, 62) based on reception signal level of two branches (Fig. 6, signal detect, 62) selectively select the gain value (interpreted as a predetermined value) corresponding to the maximum power and supplies that selected gain value to the

amplifiers (Fig. 6, 58a and 58b) of the respective branches of antennas (Fig. 6, as shown on Fig. 2, 58a and 58b receives the signal through respective antenna branches 8 a and 18b).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to selectively select the control gain value based on signal detection, as taught by Kim, into the system of AAPA, so that instead of processing the gain of individual antenna branches, calculate the gain which corresponds to the maximum power and control the amplifier gain of both the antenna branches using the selected gain, the benefit is that by using single gain value, relative noise powers between signal paths are not affected by the gain control (page 4, [0052]).

Regarding claim 2, AAPA discloses the method in communication apparatus using calculating the gain set value for two antenna branches based on reception signal level (Fig. 4).

But, does not explicitly disclose the gain set value selecting unit selects a minimum gain set value among the gain set values calculated by the gain set value calculating units of the respective branches.

In the same field of endeavor, Kim teaches gain controller unit receives the signal from the two antenna branches and the gain value with maximum signal detection having maximum signal power is selected as gain values for both the amplifiers (Fig. 6, gain control, 60 send control signal to amplifiers, 58a and 58b, the signal with maximum

so gain set value is minimum and signal with low power has higher gain value, thus selected gain based on maximum power is actually a minimum gain set value).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to selectively select the minimum gain value based on signal detection, as taught by Kim, into the system of AAPA, the benefit is that by using single gain value, relative noise powers between signal paths are not affected by the gain control (page 4, [0052]).

**6. Claims 3,4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA and Kim, as applied to claims 1 and 2 above, and further in view of Kishimoto et al. ( US 2002/0118724) (hereafter Kishimoto).**

Regarding claim 3, AAPA discloses the communication apparatus ( Fig. 4) as set forth in claim 1 or 2, wherein the each of the branches ( Fig. 4, first and second antenna branches) includes a Fourier transform unit ( Fig. 4, FFT control units, 12a and 12b) that Fourier transforms the reception signal amplified by the signal amplifying unit ( Fig. 4, amplifying units, 5a and 5b) into a frequency component; and wherein the branches share: a diversity processing unit ( Fig. 4, diversity processing unit, 13) that applies diversity processing to the signals outputted from the Fourier transform units ( Fig. 4, FFT control units, 12a and 12b) of the respective branches ( Fig. 4, first branch and second branch);

But, does not explicitly discloses a diversity processing control unit that compares an absolute value of a difference of the gain set values calculated by the gain

set value calculating units of the respective branches and a predetermined threshold value, and outputs a predetermined signal to the diversity processing unit when the absolute value of the difference is greater than the threshold value; and wherein when the diversity processing unit receives the predetermined signal, the diversity processing unit outputs a signal of the branch having the minimum gain set value without performing the diversity processing.

In the same field of endeavor, Kishimoto teaches antenna diversity communication device with multiple antenna branches and gain calculating unit for each antenna branches and comparing unit, receives the received signal strength from two respective antenna branches and compare the difference of frequencies with the threshold value and apply control based on the comparison to the switching unit, and by measuring the signal intensity of the two communication routes, it is possible to switch to a communication route with stronger signal intensity ( Fig. 10, page 10, [0195]-[0202]). Even though, it does not explicitly disclose that diversity processing unit outputs a signal, maximum power has minimum gain set value. Thus, minimum gain set value is selected.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Kishimoto, into the system of both AAPA and Kim, as a whole, so as to calculate the frequency difference between the two antenna branches signal and based on comparison with threshold, selecting the signal with maximum power (minimum gain set value), the motivation is to improve the communication performance using antenna diversity communications (page 2, [0042]).



Regarding claim 4, both AAPA and Kim do not explicitly disclose the communication apparatus as set forth in claim 3, wherein, in the diversity processing, the diversity processing unit compares amplitudes of the signals outputted from the Fourier transform units of the respective branches for each frequency, and selects a maximum amplitude for each frequency to output the signal.

In the same field of endeavor, Kishimoto teaches antenna diversity communication device with multiple antenna branches and gain calculating unit for each antenna branches and comparing unit, receives the received signal strength from two respective antenna branches and compare the difference of frequencies with the threshold value and apply control based on the comparison to the switching unit, and by measuring the signal intensity of the two communication routes, it is possible to switch to a communication route with stronger signal intensity ( Fig. 10, page 10, [0195]-[0202]).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of the invention to combine the teachings of Kishimoto, into the system of both AAPA and Kim, as a whole, so as to calculate the frequency difference between the two antenna branches signal and based on comparison with threshold, selecting the signal with maximum power (minimum gain set value), the motivation is to improve the communication performance using antenna diversity communications (page 2, [0042]).

Regarding claim 5, AAPA further discloses the communication apparatus (Fig. 4),

wherein, in the diversity processing ( Fig. 4, diversity branches, 1a and 1b), the diversity processing unit ( Fig. 4, diversity processing unit, 13) subjects amplitudes and phases of the signals outputted from the Fourier transform units ( Fig. 34, FFT control unit, 12a and 12b) of the respective branches ( Fig. 4, branches 1a and 1b) to vector synthesis for each frequency to output the signal (Fig. 4, combining diversity, page 2, lines 22-25 and page 3, lines 1-5 explains vector synthesis).

**7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA and Kim, as applied to claims 1 and 2 above, and further in view of Hasegawa et al. ( US 2004/0203460) (hereafter Hasegawa).**

Regarding claim 6, the combined teachings of AAPA and Kim disclose all the limitations except program for realizing a computer.

In the same field of endeavor, Hasegawa teaches radio communication apparatus with multiple units to perform the desired method. Furthermore, Hasegawa teaches the blocks and combination of blocks may be executed by the computer programs and these computer programs are read by a computer or programmable device and constitute a system for realizing the operation of the present embodiment. In other words, the instructions by computer programs are executed by a computer and constitute the means for carrying out the function specified by the block. The computer program are stored in memory modules such as magnetic disk, optical disks etc. (page 5, [0068]), therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the program as taught by Hasegawa, in the combined

teachings of AAPA and Kim, as a whole, in order to reduce the cost and improve the adaptability and flexibility of the communication system.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patel Dhaval whose telephone number is (571) 270-1818. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571) 272-3036. Customer Service can be reached at (571) 272-2600. The fax number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Dhaval Patel/

Examiner, Art Unit 2611

7/3/2008

/Shuwang Liu/

Supervisory Patent Examiner, Art Unit 2611

Application/Control Number: 10/532,354  
Art Unit: 2611

Page 11